Resilient support with variable flexibility, particularly for motor vehicle suspensions.

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EP0140845
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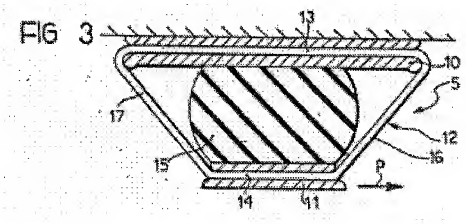
Abstract of **EP0213089**

This system can be included into the field of telecommunication techniques. It resolves the technical-practical problem of transmitting and receiving over distances analog electrical signals of luminous and/or chromatic information of a still or moving image using all the usual means for telecommunications. The essence of the solution of this problem by this invention is that it has employed the systematic application of the characteristics of electron optics correlated with the fundamental relation of geometric optics. The principal uses of this invention are in bidirectional integral telephony, with sound and video.

FIG 3



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(54) **Resilient support with variable flexibility, particularly for motor vehicle suspensions.**

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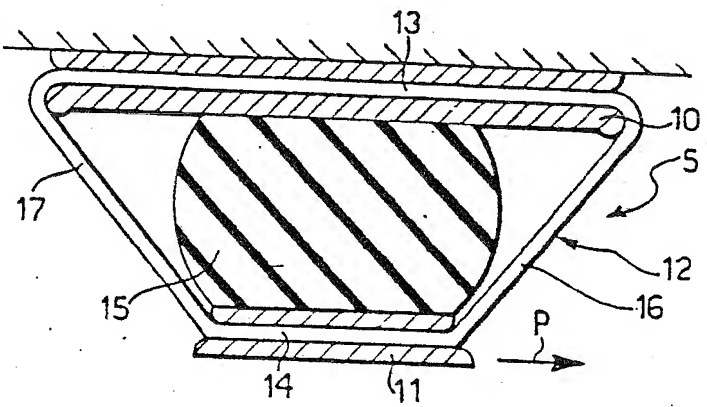
FIG 3



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Resilient support with variable flexibility, particularly for motor vehicle suspension.

The present invention relates to a resilient support for connecting a movable structure to a fixed support structure, of the known type comprising:

a first metal member for fixing to the support structure,

a second metal member for fixing to the movable structure, and

resilient means interposed between to the two metal members.

The object of the invention is to provide a resilient support of the type specified above, which can be used, for example, to connect the central part of the axle to the body of a motor vehicle, and which has a simple, reliable and economical structure.

In order to achieve this object, the present invention provides a resilient support of the type specified above, characterised in that it further includes a flexible band in the form of a closed ring having a first part fixed to the first metal member and a second part fixed to the second metal member and disposed parallel to and spaced from the first part, and in that the resilient means are interposed in a compressed condition between the two parts so as to put under tension third and fourth parts of the band which join the ends of the first and second parts together.

The second part is shorter than the first part, whereby the flexible band takes up a trapezoidal configuration in which the two bases are constituted by the first and second parts of the band and in which the two oblique sides are constituted by the third and fourth parts of the band. In a preferred embodiment, the resilient means are constituted by a body of elastomeric material.

By virtue of the particular construction and arrangement, the resilient support is adapted to withstand, without yielding, a load which tends to move the movable member relative to the support structure in a direction parallel to that of the second part of the flexible band, as long as this load is kept below a predetermined threshold value. Above this value, one of the two oblique sides of the band ceases to work under tension and collapses, allowing relative movement between the two metal members of the support.

Further characteristics and advantages of the invention will become apparent from the description which follows with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figures 1 and 2 are two schematic plan views of a rear suspension for motor vehicles utilizing a support according to the the invention, in two different conditions of operation.

Figure 3 is a schematic view of the resilient support according to the invention, and

Figure 4 is a graph illustrating the operating characteristics of the resilient support of Figure 3.

In Figures 1 and 2, a rear suspension for motor vehicles with front wheel drive, generally indicated 1, includes an axle 2 supporting the two rear wheels 3 of the motor vehicle at its ends. A suspension of this type is described and illustrated, for example, in European Patent Application No. 140845 (EP-A-0 140845) filed by the same Applicants.

The axle 2 has essentially a V-shape disposed in a horizontal plane so that its central part (indicated 4) is displaced towards the front of the motor vehicle (the direction of movement of the vehicle being indicated by the arrow A in Figures 1 and 2).

The central part 4 of the axle 2 is articulated to the body of the motor vehicle (indicated 6) about a transverse axis 7. A resilient support 5 (illustrated schematically in Figures 1 and 2) is also interposed in this connection. The axle 2 is also connected to the body 6 by two torque arms 8 each of which has a front end articulated to the body 6 and a rear end articulated to the axle 2 adjacent a respective end portion thereof. The two front ends of the torque arms 8 are aligned along a transverse axis coincident with the axis 7. The resilient means of the suspension are constituted by a pair of helical springs interposed between the end portions of the axle and the body. In the drawings, the points of application of the springs are indicated 9. As is clear from Figures 1 and 2, the two torque arms 8 are disposed in directions which converge on each other towards the rear of the motor vehicle. Moreover, the resilient support 5 is adapted to allow small movements of the axle relative to the body in a transverse direction and small rotational movements of the axle in the horizontal plane.

One embodiment of the resilient support useable for this purpose is illustrated in the document EP-A-0 140 845.

The present invention proposes a new type of resilient support useable for the same purpose, and which has particular characteristics of simplicity and reliability.

As is clear from Figures 1 and 2, which respectively illustrate the suspension in the normal operating condition and in a condition in which the axle is displaced transversely relative to the body (a con-

dition which occurs when the vehicle is cornering), the transverse movements of the axle are also accompanied by rotation of the latter in the horizontal plane as a result of the particular disposition of the torque arms 8. This allows, for example, the rear axle to tilt on bends and give rise to understeering behaviour of the vehicle. At the same time, it is necessary for the resilient support 5 not to permit transverse movements of the axle relative to the body when the transverse loads are below a predetermined value. Thus, the risk of the axle rotating in the horizontal plane, even during straight line movement, as a result of any transverse forces caused by unevenness of the ground, can be avoided.

Figure 3 illustrates schematically the resilient support according to the invention. It includes a first metal member 10 for fixing to the body of the motor vehicle and a second metal member 11 for fixing to the central part 4 of the axle 2. The two metal members 10, 11 are connected by a flexible band 12, for example of rubber webbing, which has a first part 13 fixed to the metal member 10 and a second part 14 fixed to the metal member 11. A body 15 of elastomeric material is interposed in a compressed condition between the two metal members 11, 10 so as to put under tension the two parts 16, 17 of the band 12 which join the ends of the parts 13, 14 together. The flexible band 12 is in the form of a closed ring and thus assumes a trapezoidal configuration in which the bases are constituted by the two parallel parts 13, 14 of the band while the two oblique sides are constituted by the two parts 16, 17 of the band. The trapezoidal configuration arises from the fact that the part 14 fixed to the metal member 11 is shorter than the part 13 fixed to the metal member 10.

In use, the resilient support 5 withstands a load P acting on the metal member 11 and directed parallel to the part 14 without yielding, as long as this load is kept below a predetermined threshold value P_o . Above this load, one of the two oblique parts 16, 17 of the flexible band (the right-hand part or the left-hand part, respectively, according to whether the load P acts towards the right or towards the left with reference to Figure 3) ceases to work under tension and collapses, allowing the displacement of the metal member 11 relative to the metal member 13.

The graph of Figure 4 illustrates the displacement obtained as a function of the load P. As is clear form the graph, the movement is zero as long as the value of the load P does not surpass the threshold value P_o.

The resilient support acording to the invention has particular advantages from the point of view of simplicity, reliability and silence of operation.

The support according to the invention is also useable, of course, in different applications from that described above by way of example.

Naturally, the principle of the invention remaining the same, the constructional details and forms of embodiments may be varied widely with respect to those described and illustrated purely by way of example, without thereby departing from the scope of the present invention.

Claims

1. Resilient support for connecting a movable structure to a fixed support structure, comprising:

a first metal member (10) for fixing to the support structure,

a second metal member (11) for fixing to the movable structure, and

resilient means interposed between the metal members,

characterised in that the resilient support further includes a flexible band (12) in the form of a closed ring having a first part (13) fixed to the first metal member (10) and a second part (14) fixed to the second metal member (11) and disposed parallel to and spaced from the first part (13),and in that the resilient means are interposed in a compressed condition between the two parts so as to put under tension third and fourth parts (16,17) of the band which join the ends of the first and second parts - (13,14) together.

2. Resilient support according to Claim 1, characterised in that the resilient means are constituted by an element (15) of elastomeric material.

3. Resilient support according to Claim 1, characterised in that the second part (14) of the flexible band is shorter than the first part (13), whereby the band takes up a trapezoidal shape in which the two bases are constituted by the first and second parts (13, 14) and in which the two oblique sides are constituted by the third and fourth parts (16, 17).

FIG. 1

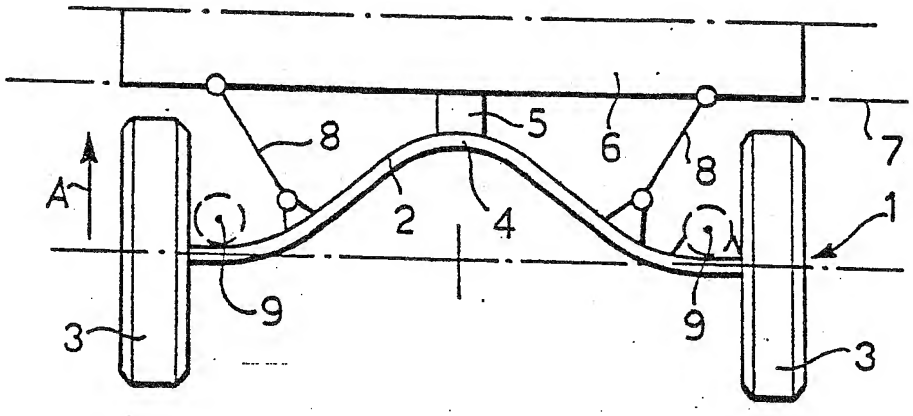


FIG 2

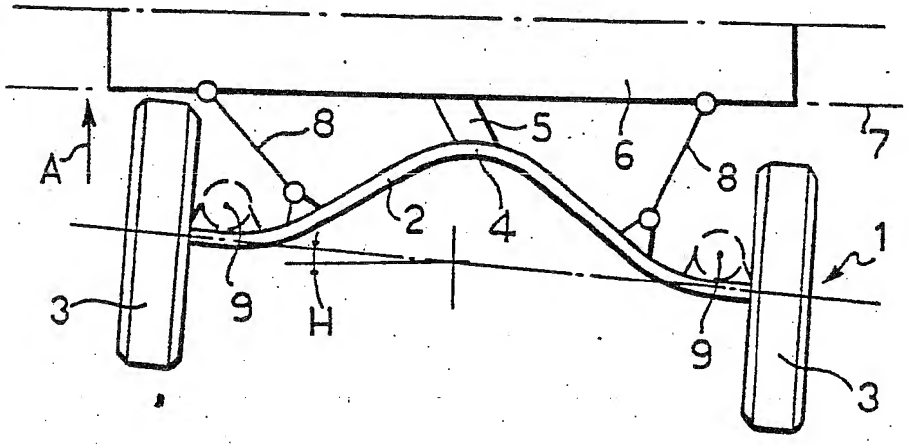


FIG 3

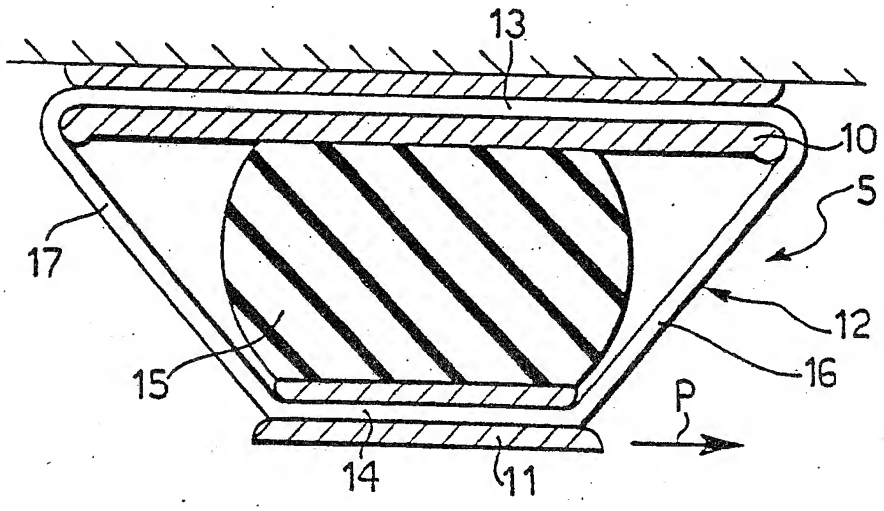
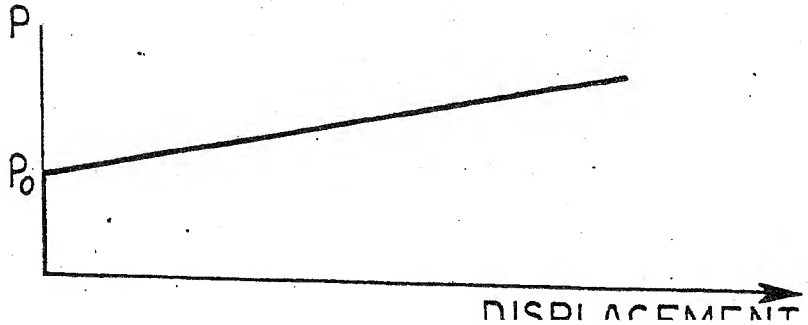


FIG. 4



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EUROPEAN SEARCH REPORT

Application number

EP 86 83 0210

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
D,Y	EP-A-0 140 845 (FIAT) * Page 14, lines 1-27; figures 1,2,4 *	1	B 60 G 9/02 F 16 F 1/36
Y	US-A-1 703 297 (CHASE) * Page 1, line 33 - page 2, line 40; figures 1-5 *	1	
A		2	
A	FR-A-2 340 834 (RENAULT) * Figures 11,12 *	1,2	
A	US-A-3 081 993 (WALLERSTEIN) * Column 1, lines 53-67; figures 3,4 *	1,2	
A	DE-U-1 906 804 (METZELER AG)		TECHNICAL FIELDS SEARCHED (Int. Cl.4) B 60 G F 16 F B 60 K 5/12
A	US-A-4 006 892 (KOENEMAN)		
A	US-A-1 739 025 (CHILTON)		
A	FR-A-1 544 131 (CITROEN)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03-10-1986	ESPEEL R.P.

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